

FEATHER RIVER STEELHEAD ATTRIBUTES

Location	LIFESTAGE	MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
LFC	Regulatory Requirements (1)													
	Water Temperature Target - Hatchery	< 55°F			51°F	55°F	56°F	60°F		58°F	52°F	51°F		< 55°F
	Water Temperature Target - Robinson Riffle						65°F							
	Flow Requirement	600 cfs												
	Adult Immigration and Holding													
	Time Period (6)													
	Water Temperature Target (2)	52°F (56°F)					52°F (56°F)							
	Spawning and Egg Incubation													
	Time Period (7)													
	Water Temperature Target (3)	52°F (54°F)												
	SP-F16 Flow Target (11)	600 cfs (800 cfs)												
YOY Downstream Movement/Emigration														
Time Period (8)														
Water Temperature Target (4)	65°F (68°F)													
Fry Rearing														
Time Period (9)														
Water Temperature Target (4)	65°F (68°F)													
SP-F16 Flow Target (11)	180 cfs (850 cfs)													
Juvenile Rearing and Resident Rainbow Trout														
Time Period (9)														
Water Temperature Target (4)	65°F (68°F)													
SP-F16 Flow Target (11)	300 cfs (3000 cfs)													
Smolt Emigration														
Time Period (10)														
Water Temperature Target (5)	52°F (55°F)													

Location	LIFESTAGE	MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
HFC	Regulatory Requirements (1)													
	Flow Requirement	1,700 cfs or 1,200 cfs			1700 or 1000		1,000 cfs					1,700 cfs or 1,200 cfs		
	Water Temperature Target	None Specified												
	Rampdown Rate	200 cfs in a 24 hour period												
	Adult Immigration and Holding													
	Time Period (6)													
	Water Temperature Target (2)	52°F (56°F)						52°F (56°F)						
	Spawning and Egg Incubation													
	Time Period (7)													
	Water Temperature Target (3)	52°F (54°F)												
	SP-F16 Flow Target (11)	750 cfs (1,200 cfs)												
YOY Downstream Movement/Emigration														
Time Period (8)														
Water Temperature Target (4)							65°F (68°F)							
Fry Rearing														
Time Period (9)														
Water Temperature Target (4)							65°F (68°F)							
SP-F16 Flow Target (11)							5,000 cfs (2,000 cfs)							
Juvenile Rearing and Resident Rainbow Trout														
Time Period (9)														
Water Temperature Target (4)							65°F (68°F)							
SP-F16 Flow Target (11)							500 cfs (1,000 cfs)							
Smolt Emigration														
Time Period (10)														
Water Temperature Target (5)	52°F (55°F)													

FEATHER RIVER SPRING-RUN CHINOOK SALMON ATTRIBUTES

Location	LIFESTAGE	MONTH											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
LFC	Regulatory Requirements (1) Water Temperature Target - Hatchery Water Temperature Target - Robinson Riffle Streamflow Target	< 55°F			51°F	55°F	56°F	60°F	58°F	52°F	51°F	< 55°F	
								65°F					
		600 cfs											
	Adult Immigration and Holding Time period (5) Water Temperature Target (2)												
					60°F (64°F)								
	Spawning and Egg Incubation Time Period (6) Water Temperature Target (3) SP-F16 Flow Target (10)												
		56°F (58°F)									56°F (58°F)		
		800 cfs (600 cfs)									800 cfs (600 cfs)		
	Post-Emergent Fry Downstream Movement Time Period (7) Water Temperature Target (4)												
		60°F (65°F)										60°F (65°F)	
	Fry Rearing Time Period (8) Water Temperature Target (4) SP-F16 Flow Target (10)												
		60°F (65°F)									60°F (65°F)		
		200 cfs (3,000 cfs)									200 cfs (3,000 cfs)		
	Juvenile Rearing Time Period (8) Water Temperature Target (4) Streamflow Target (10)												
60°F (65°F)													
200 cfs (3,000 cfs)													
Smolt Emigration (6) Time Period (9) Water Temperature Target (4)													
					60°F (63°F)								

Location	LIFESTAGE	MONTH													
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
HFC	Regulatory Requirements (1)														
	Instream Flow Requirement	1, 700 cfs or 1,200 cfs		1700 or 1000		1,000 cfs						1, 700 cfs or 1,200 cfs			
	Rampdown Rate	200 cfs in a 24 hour period													
	Adult Immigration and Holding														
	Time period (5)														
	Water Temperature Target (2)	60°F (64°F)													
	Spawning and Egg Incubation														
	Time Period (6)														
	Water Temperature Target (3)	56°F (58°F)									56°F (58°F)				
	SP-F16 Flow Target (10)	1,650 cfs (1,200 cfs)									1,650 cfs (1,200 cfs)				
Post-Emergent Fry Downstream Movement															
Time Period (7)															
Water Temperature Target (4)	60°F (65°F)						60°F (65°F)								
Fry Rearing															
Time Period (8)															
Water Temperature Target (4)	60°F (65°F)									60°F (65°F)					
SP-F16 Flow Target (10)	6,750 cfs (1,200 cfs)									6,750 cfs (1,200 cfs)					
Juvenile Rearing															
Time Period (8)															
Water Temperature Target (4)	60°F (65°F)														
Streamflow Target (10)	500 cfs (1,000 cfs)														
Smolt Emigration (6)															
Time Period (9)															
Water Temperature Target (4)	60°F (63°F)														

FEATHER RIVER FALL-RUN CHINOOK SALMON ATTRIBUTES

Location	LIFESTAGE	MONTH												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
LFC	Regulatory Requirements (1)													
	Water Temperature Target - Hatchery	< 55°F			51°F	55°F	56°F	60°F		58°F	52°F	51°F		< 55°F
	Water Temperature Target - Robinson Riffle						65°F							
	Streamflow Target	600 cfs												
	Adult Immigration and Holding													
	Time period (5)							60°F (64°F)						
	Water Temperature Target (2)													
	Spawning and Egg Incubation													
	Time Period (6)													
	Water Temperature Target (3)	56°F (58°F)								56°F (58°F)				
SP-F16 Flow Target (10)	800 cfs (600 cfs)								800 cfs (600 cfs)					
Post-Emergent Fry Downstream Movement														
Time Period (7)														
Water Temperature Target (4)	60°F (65°F)										60°F (65°F)			
Fry Rearing														
Time Period (8)														
Water Temperature Target (4)	60°F (65°F)										60°F (65°F)			
SP-F16 Flow Target (10)	200 cfs (3,000 cfs)										200 cfs (3,000 cfs)			
Juvenile Rearing														
Time Period (8)														
Water Temperature Target (4)						60°F (65°F)								
Streamflow Target (10)						200 cfs (3,000 cfs)								
Smolt Emigration (6)														
Time Period (9)														
Water Temperature Target (4)						60°F (63°F)								
HFC	Regulatory Requirements (1)													
	Instream Flow Requirement	1, 700 cfs or 1,200 cfs		1700 or 1000		1,000 cfs					1, 700 cfs or 1,200 cfs			
	Rampdown Rate	200 cfs in a 24 hour period												
	Adult Immigration and Holding													
	Time period (5)							60°F (64°F)						
	Water Temperature Target (2)													
	Spawning and Egg Incubation													
	Time Period (6)													
	Water Temperature Target (3)	56°F (58°F)								56°F (58°F)				
	SP-F16 Flow Target (10)	1,650 cfs (1,200 cfs)								1,650 cfs (1,200 cfs)				
Post-Emergent Fry Downstream Movement														
Time Period (7)														
Water Temperature Target (4)	60°F (65°F)										60°F (65°F)			
Fry Rearing														
Time Period (8)														
Water Temperature Target (4)	60°F (65°F)													
SP-F16 Flow Target (10)	6,750 cfs (1,200 cfs)										6,750 cfs (1,200 cfs)			
Juvenile Rearing														
Time Period (8)														
Water Temperature Target (4)						60°F (65°F)								
Streamflow Target (10)						500 cfs (1,000 cfs)								
Smolt Emigration (6)														
Time Period (9)														
Water Temperature Target (4)						60°F (63°F)								

Fall-Run Chinook Salmon Footnotes

- 1 Regulatory requirements for instream flow and water temperature are based on DWR (1983) and the NOAA Fisheries (2002).
- 2 The primary water temperature target for fall-run Chinook salmon adult immigration and holding was derived from the synthesis of information provided by NOAA Fisheries (1997), NOAA Fisheries (2000), and ODEQ (1995). The secondary water temperature target for fall-run Chinook salmon immigration and holding was derived from the synthesis of information provided by NOAA Fisheries (1997), EPA (2003), and Berman (1990).
- 3 The primary water temperature target for fall-run Chinook salmon spawning and egg incubation was derived from the synthesis of information reported by USBR (2003), NOAA Fisheries (1993), USFWS (1995), NOAA Fisheries (1997), USFWS (1999), NOAA Fisheries (2002), and Groves and Chandler (1999). The secondary water temperature target for fall-run Chinook salmon spawning and egg incubation was derived from the synthesis of information reported by NOAA Fisheries (2002), Combs and Burrows (1957), and USBR (2003).
- 4 The primary water temperature target for fall-run Chinook salmon post-emergent fry downstream movement, fry rearing, juvenile rearing, and smolt emigration was derived from the synthesis of information provided by Seymour (1956), Banks et al. (1971), Brett et al. (1982), (Rich 1987), NOAA Fisheries, (1993), Marine (1997), NOAA Fisheries (1997), NOAA Fisheries (2000), and NOAA Fisheries (2002). The secondary water temperature target for fall-run Chinook salmon post-emergent fry downstream movement, fry rearing, juvenile rearing, and smolt emigration was derived from the synthesis of information provided by Marine (1997), Zedonis and Newcomb (1997), and Clark and Shelbourn (1995).
- 5 Fall-run Chinook salmon immigration and holding timing was derived from Sommer (2001), Moyle (2002), DWR (1982), and NOAA Fisheries (1999).
- 6 Fall-run adult Chinook salmon spawning and egg incubation timing was based on analysis of data collected during the 2002 carcass survey conducted on the Feather River by DWR. Analysis of the data was presented in DWR (2004).
- 7 Fall-run Chinook salmon post-emergent fry downstream movement timing was determined based on information presented in DWR (2002), DWR (2003b), and Seescholtz et al. (2003)
- 8 Fall-run Chinook salmon fry rearing and juvenile rearing timing was calculated based on reported emergence and emigration timing.
- 9 Fall-run Chinook salmon smolt emigration timing was determined based on personal communications with DWR biologists B. Cavallo and J. Kindopp.
- 10 Streamflow targets for fall run Chinook salmon spawning, fry rearing, and juvenile rearing lifestages were derived from DWR (2003c).

Spring-Run Chinook Salmon Footnotes

- 1 Regulatory requirements for instream flow and water temperature are based on DWR (1983) and the NOAA Fisheries (2002).
- 2 The primary water temperature target for spring-run Chinook salmon adult immigration and holding was derived from the synthesis of information provided by NOAA Fisheries (1997), NOAA Fisheries (2000), and ODEQ (1995). The secondary water temperature target for spring-run Chinook salmon immigration and holding was derived from the synthesis of information provided by NOAA Fisheries (1997), EPA (2003), and Berman (1990).
- 3 The primary water temperature target for spring-run Chinook salmon spawning and egg incubation was derived from the synthesis of information reported by USBR (2003), NOAA Fisheries (1993), USFWS (1995), NOAA Fisheries (1997), USFWS (1999), NOAA Fisheries (2002), and Groves and Chandler (1999). The secondary water temperature target for spring-run Chinook salmon spawning and egg incubation was derived from the synthesis of information reported by NOAA Fisheries (2002), Combs and Burrows (1957), and USBR (2003).
- 4 The primary water temperature target for spring-run Chinook salmon post-emergent fry downstream movement, fry rearing, juvenile rearing, and smolt emigration was derived from the synthesis of information provided by Seymour (1956), Banks et al. (1971), Brett et al. (1982), (Rich 1987), NOAA Fisheries, (1993), Marine (1997), NOAA Fisheries (1997), NOAA Fisheries (2000), and NOAA Fisheries (2002). The secondary water temperature target for spring-run Chinook salmon post-emergent fry downstream movement, fry rearing, juvenile rearing, and smolt emigration was derived from the synthesis of information provided by Marine (1997), Zedonis and Newcomb (1997), and Clark and Shelbourn (1995).
- 5 Spring-run Chinook salmon adult immigration and holding timing was derived from Sommer (2001), Moyle (2002), DWR (1982), and NOAA Fisheries (1999), and DWR (2003a).
- 6 Spring-run adult Chinook salmon spawning and egg incubation timing was based on analysis of data collected during the 2002 carcass survey conducted on the Feather River by DWR. Analysis of the data was presented in the SP-F10 Task 2D Interim Report.
- 7 Spring-run Chinook salmon post-emergent fry downstream movement timing was determined based on information presented in DWR (2002), DWR (2003b), and Seescholtz et al. (2003)
- 8 Spring-run Chinook salmon fry rearing and juvenile rearing timing was calculated based on reported emergence and emigration timing.
- 9 Spring-run Chinook salmon smolt emigration timing was determined based on personal communications with DWR biologists B. Cavallo and J. Kindopp.
- 10 Streamflow targets for spring-run Chinook salmon spawning, fry rearing, and juvenile rearing lifestages were derived from DWR (2003c).

Steelhead Footnotes

- 1 Regulatory requirements for instream flow and water temperature are based on DWR (1983) and the NOAA Fisheries (2002).
- 2 The primary water temperature target for steelhead adult immigration and holding was derived from the synthesis of information provided by USBR (1997), NOAA Fisheries (2000), NOAA Fisheries (2002), USBR (2003), and State Water Resources Control Board (2003). The secondary water temperature target for steelhead adult immigration and holding was derived from the synthesis of information provided by Lietritz and Lewis (1980), and McCullough (2001).
- 3 The primary water temperature target for steelhead spawning and egg incubation was derived from the synthesis of information reported by Humpesch (1985), USBR (1997), USFWS (1995), NOAA Fisheries (2000), NOAA Fisheries (2002), and State Water Resources Control Board (2003). The secondary water temperature target for steelhead spawning and egg incubation was derived from the synthesis of information reported by Timoshina (1972), Redding and Schreck (1979), Kamler and Kato (1983), Humpesch (1985), Rombough (1988), and McCullough (2001).
- 4 The primary water temperature target for steelhead YOY downstream movement/emigration, fry rearing, and juvenile rearing, was derived from the synthesis of information provided by McCauley and Pond (1971), Cherry et al. (1977), Cech and Myrick (1999), and NOAA Fisheries (2000). The secondary water temperature target for steelhead post-emergent fry downstream movement, fry rearing, and juvenile rearing was derived from the synthesis of information provided by Cech and Myrick (1999), and EPA (2001).
- 5 The primary water temperature target for steelhead smolt emigration was derived from the synthesis of information provided by Myrick and Cech (2001). The secondary water temperature target for steelhead smolt emigration was derived from the synthesis of information provided by Zaugg and Wagner (1973), Wedemeyer et al. (1980), and McCullough (2001).
- 6 Steelhead adult immigration and holding timing was derived from the synthesis of information provided by S.P. Cramer & Associates (1995), Busby et al. (1996), McEwan (2001), Moyle (2002), and personal observations of DWR biologists B. Cavallo and J. Kindopp.
- 7 Steelhead spawning and egg incubation timing was derived from the synthesis of information provided by Busby et al. (1996), Interagency Ecological Program Steelhead Project Work Team (1998), McEwan (2001), Moyle (2002), and personal observations of DWR biologists B. Cavallo and J. Kindopp.
- 8 Steelhead YOY downstream movement/emigration timing was determined based on information presented in, DWR (2002), DWR (2003b), and Seescholtz et al. (2003)
- 9 Steelhead fry rearing and juvenile rearing timing was based on the synthesis of information provided by McEwan (2001), DWR (2002), Seescholtz et al. (2003), and personal observations by DWR biologists B. Cavallo and J. Kindopp.
- 10 Steelhead smolt emigration timing was determined based on the synthesis of information provided by USFWS (1995), Snider and Titus (2000), McCewan (2001), Newcomb and Coon (2001), and the personal observations of DWR biologists B. Cavallo and J. Kindopp.
- 11 Streamflow targets for steelhead spawning, fry rearing, and juvenile rearing lifestages were derived from DWR (2003c).